

# PATENT SPECIFICATION



Application Date: Dec. 23, 1924. No. 30,905/24. **234,006**

Complete Accepted: May 21, 1925.

## COMPLETE SPECIFICATION.

### Improvements in and relating to Motor Driven Railway and the like Vehicles.

I, JACOB BUEHLI, of 64, Zürcherstrasse, Winterthur, Switzerland, a citizen of the Swiss Republic, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It has already been proposed in vehicles adapted to run on rails, in which the middle is supported, for instance six-wheeled vehicles of the kind referred to, to make the middle axle slidable in the direction of its own axis and to link up the two outer axles to the middle one in such a manner that they set themselves approximately radially when the vehicle is negotiating a curve. It has also been proposed to provide four-wheeled vehicles having a long wheel-base with driving axles, which are driven through Cardan shafts by motors rigidly fixed to the under frame of the vehicle between the said driving axles. This kind of drive, however, has the disadvantage that in curves the driving axles not only do not set themselves radially, but even set themselves so that the wheel of the forward axle, which is the one on the inside of the curve, is in advance.

According to the present invention the driving motor or motors is or are not fixed to the underframe, but on a separate guiding frame, which is movable laterally with respect to the body of the vehicle and which guides the two driving axles after the manner of a radial bogie.

As compared with the arrangements used hitherto such a drive has a number of considerable advantages. The driving axles set themselves, as in the six-wheeled vehicles mentioned above, radially in curves in a positive manner and run exceedingly smoothly on a straight track. There is little wear on the rims of the wheels and the rails, corrugations are not formed and the vehicle will pass noiselessly round curves; it is possible to negotiate curves having a very small radius with a vehicle of a long wheel-base and it is unnecessary to provide

special men for lubricating the rails. For a given pressure on the axles the useful load can be increased, as the weight of the motors is taken up by a separate bogie. The pressure on the driving axles can be reduced, if the points of support of the vehicle body be transferred to members connecting the driving axles with the guiding bogie. As in the case of motor cars all gears can be enclosed in an oil-tight manner so that loss of oil is prevented. The axles may be driven as in motor cars through a differential gear, which prevents loss of power. The motors may be made to better advantage and more cheaply, as they lie in the longitudinal direction of the vehicle, it being possible to use high speed motors with artificial ventilation and air filters.

In Figs. 1 and 2 of the drawing a constructional example of the invention is shown diagrammatically in elevation and plan.

Fig. 3 is a modified form, in which the vehicle is divided in the middle.

Fig. 4 shows another modification with a divided guiding bogie in side elevation.

Fig. 5 and 6 show a portion of the vehicle as in Fig. 4 to an enlarged scale and in two different positions.

Fig. 7 is an end view from the right of Fig. 6.

Near the two ends of the vehicle shown in Figs. 1 and 2 are the driving axles *a* of the same, which are driven through the universal coupling members *b* each by means of an electric motor *c*. Other motors, such as explosion or Diesel motors, may be used in place of the electric motors, but this forms no part of the invention. According to the invention the motors are not connected rigidly to the body of the vehicle, but are mounted on a separate guiding bogie *f* having a short wheel-base and small wheels, which is free to move laterally under the vehicle, so that it can give laterally (Fig. 2). Driving axles *a* are driven from the guiding bogie *f* through the coupling 100

[Price 1/-].

members *b* in the manner of a radial bogie. The driving axles each support the body of the vehicle by means of a pivotal pin or foot-step bearing *d* resting on the driving axle-box, a transverse bar *d*<sup>1</sup> and the supporting springs *d*<sup>11</sup> fixed to the latter and to links *d*<sup>111</sup> carried by the vehicle, so that the body of the vehicle is capable of moving longitudinally with respect to the driving axles. The latter are driven in a known manner through a bevel wheel transmission gear and may be driven through a differential gear (not shown in the drawing).

In the modification shown in Fig. 3 the body of the vehicle is divided in the middle. The two halves *e*<sup>1</sup> and *e*<sup>2</sup> of the vehicle are connected at their adjacent ends by flexible bellows *g* and each rest with a vertical pivotal pin *h* on the guiding bogie *f*.

The modification shown in Figs. 4—7 differs substantially from the constructional forms already described substantially in this, that the guiding bogie is divided into two parts *f*<sup>1</sup> and *f*<sup>2</sup> and that the body of the vehicle *e* rests between the two axles *a* by means of the supporting springs *d*<sup>1</sup> and the transverse bars *d*<sup>1</sup> and pivotal pins or foot-step bearings *d* on the coupling members *b*<sup>1</sup> which rigidly connect the parts *f*<sup>1</sup> and *f*<sup>2</sup> of the guiding bogie with the corresponding axle-box *a*<sup>1</sup>. By the body of the vehicle resting in this manner on the coupling members *b*<sup>1</sup>, it is possible to distribute the weight of the body of the vehicle as desired both over the driving axles and the guiding bogie. A comparison of Figs. 5 and 6 will show that the driving axles and the guiding bogie are capable of longitudinal displacement with respect to the body of the vehicle, say by the distance *k*, so that thrusts exerted on the underframe or the body of the vehicle are compensated and the driving axles are brought back into their mean position.

Besides the axles *a* at least one axle of the guiding bogie *f* may be driven. The drive of the two driving axles *a* and in certain cases of the guiding bogie *f* may be effected by a single motor resting on the latter. In some cases it will be found sufficient to provide the guiding bogie *f* with a single axle; but if two axles are found to be insufficient, three or more may be provided.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A motor driven vehicle adapted to

run on rails and having a long wheel-base, the driving motor or motors of which works or work from the middle of the vehicle onto the driving axles near the ends of the vehicle through universal coupling members, characterised by the feature, that at least one driving motor is provided on a guiding bogie, which is capable of lateral movement with respect to the body of the vehicle supported on the driving axles and from which the two driving axles can be guided after the manner of a radial bogie.

2. A vehicle, as claimed in Claim 1, characterised by the feature, that the body of the vehicle rests with a pivotal pin on each of the two driving axles.

3. A vehicle, as claimed in Claim 1, characterised by the feature, that the body of the vehicle is not directly connected to the guiding bogie.

4. A vehicle, as claimed in Claim 1, characterised by the feature, that the body of the vehicle is divided in the middle and that the two halves thereof rest on pivotal pins both on the driving axles and on the guiding bogie.

5. A vehicle, as claimed in Claim 1, characterised by the feature, that two motors are provided on the guiding bogie, each of which drives one of the two driving axles.

6. A vehicle, as claimed in Claim 1, characterised by the feature, that a single motor is provided on the guiding bogie, which drives both driving axles.

7. A vehicle, as claimed in Claim 1, characterised by the feature, that besides the driving axles the guiding bogie as well is directly motor driven.

8. A vehicle, as claimed in Claim 1, characterised by the feature, that the body of the vehicle rests between the driving axles on the coupling members connecting the latter with the guiding bogie, for the purpose of distributing the weight of the body of the vehicle as desired both to the driving axles and to the guiding bogie.

9. A vehicle, as claimed in Claims 1 and 8, characterised by the feature, that the guiding bogie is divided and that the parts thereof are each connected to one of the driving axles, through a coupling member so as to form a rigid unit.

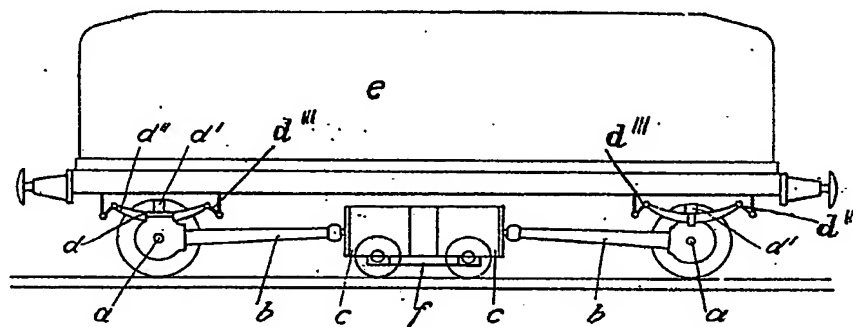
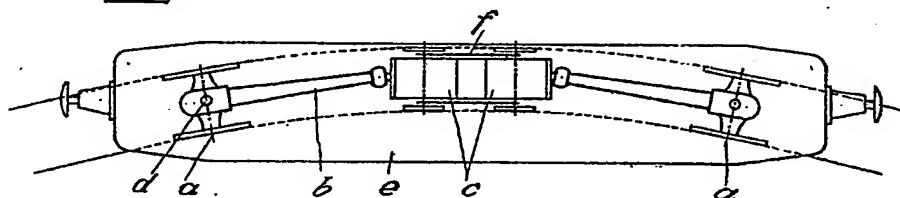
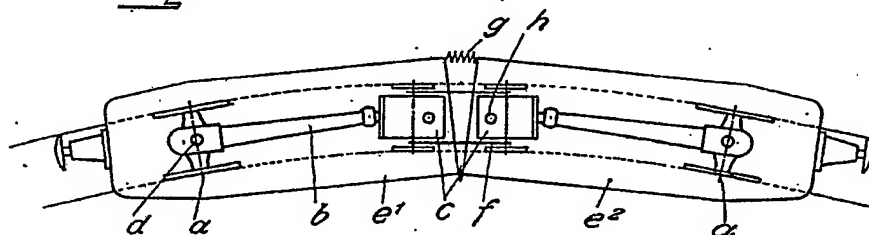
10. The improved motor driven vehicle adapted to run on rails and having a long wheel-base, substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 18th day of December, 1924.

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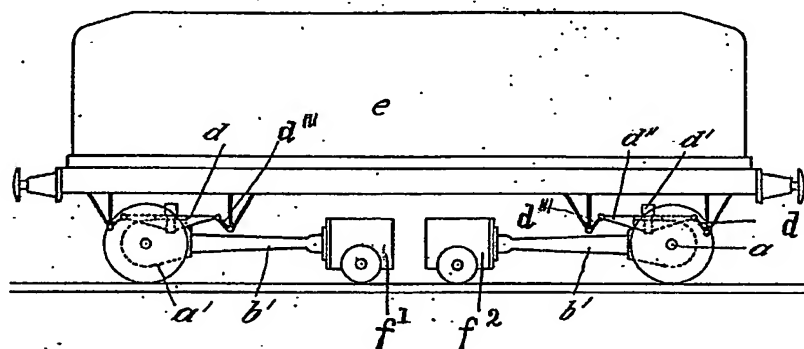
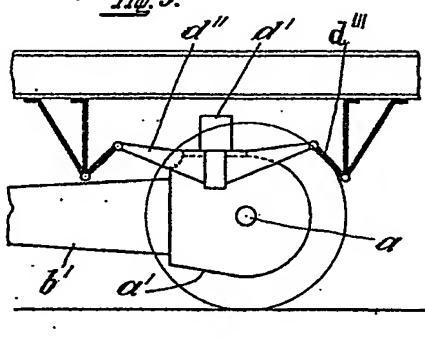
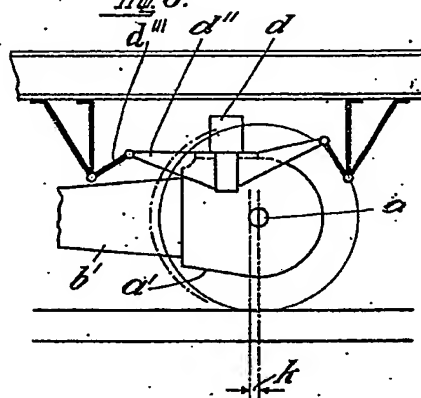
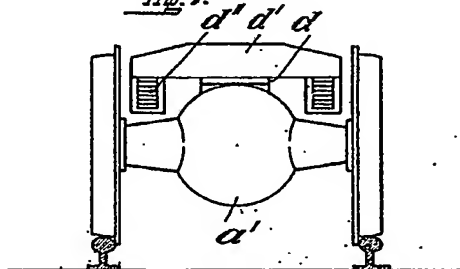
Fig. 1.Fig. 2.Fig. 3.

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SHEET 1

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SHEET 2

Fig. 4.Fig. 5.Fig. 6.Fig. 7.

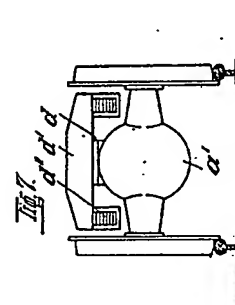
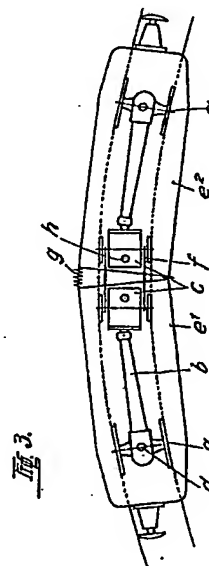
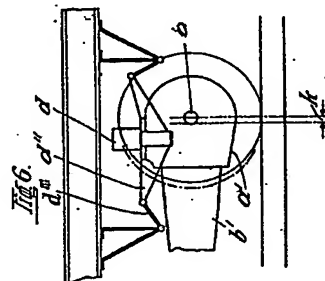
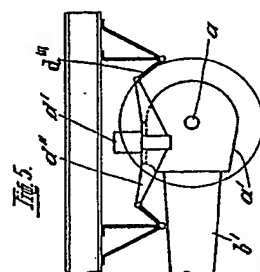
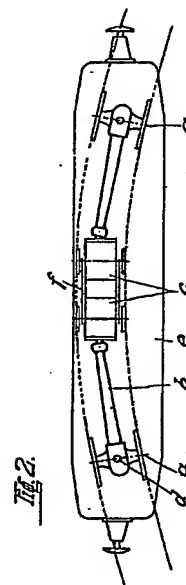
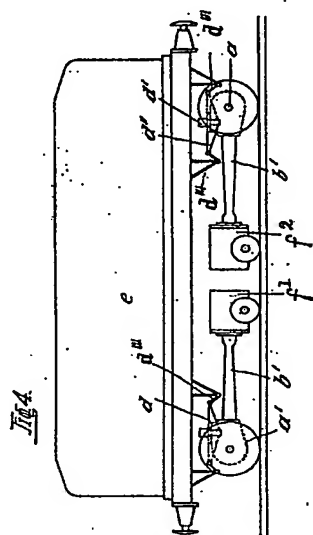
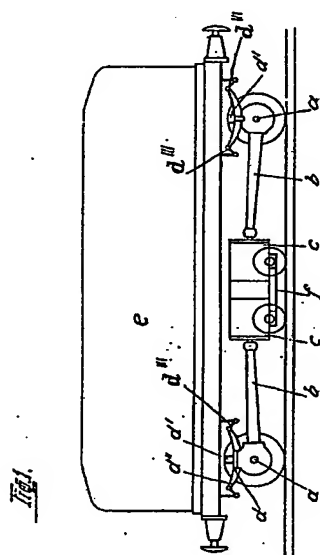
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**SHEET 2**

**REF ID: A66888**



[This Drawing is a reproduction of the Original on a reduced scale]

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